



UNITED STATES PATENT AND TRADEMARK OFFICE

ben

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/753,241	01/08/2004	Arne W. Ballantine	END9-2000-0100US2	7960

30449 7590 08/30/2006

SCHMEISER, OLSEN & WATTS
22 CENTURY HILL DRIVE
SUITE 302
LATHAM, NY 12110

EXAMINER

TSAL, H JEY

ART UNIT	PAPER NUMBER
----------	--------------

2812

DATE MAILED: 08/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/753,241	Applicant(s) BALLANTINE ET AL.	
	Examiner H.Jey Tsai	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4,5,10-12,16,20,23,24,47,49-73 and 76 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4-5, 10-12, 16, 20, 23-24,47, 49-73, 76 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 4, 47, 63, 64-66, 70-73 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Mochizuki 4,533,935, previously applied.

Mochizuki teaches method for increasing an electrical resistance of a resistor, comprising the steps of:

providing a semiconductor structure that includes the resistor 26, fig. 5c, col. 3, lines 38-49,

oxidizing a fraction F of a surface layer of the resistor with oxygen particles (dry oxygen, a gas) or NH₃ or nitrogen (a gas), resulting in the increasing of the electrical resistance of the resistor, with fraction of F < 1 less than conductive layer 18, col. 4, lines 50-51, col. 5, lines 1-68, col. 6, lines 1-36,

gas is either inherently flowing or non-flowing,

wherein a dimension of the portion of the resistor does not exceed about 1 micron, col. 5, lines 1-13.

Claims 4, 5, 10-12, 47, 55, 56, 57, 60-66, 67, 69, 71-73 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Gofuku et al. 4,785,157, previously applied.

Gofuku et al. teaches method for increasing an electrical resistance of a resistor, comprising the steps of:

providing a semiconductor structure 1 (IC or silicon) that includes the resistor 1, fig. 1-3, col. 2, lines 34-40, col. 5, lines 30-35, col. 6, line 30,

oxidizing a fraction F (spot on the surface by laser 6, 7) of a surface layer 1 of the resistor with oxygen particles (oxygen, a gas, see col. 6, lines 34-68) either flowing or non-flowing (blowing oxygen on the spot which is flowing or a sealed vessel with a window filled with gas which is non-flowing) and includes directing a beam onto the surface, resulting in the increasing of the electrical resistance of the resistor, with fraction of $F < 1$ less than resistor layer 1 (spot of layer 6 and 7 is less than resistor layer 1), col. 2, lines 50-51, col. 5, lines 1-68, col. 6, lines 1-36, col. 6, lines 34-68,

wherein a dimension of the portion of the resistor does not exceed about 1 micron, col. 5, lines 1-13,

beam is a laser beam radiation 6, 7, col. 6, lines 34-68,

F can be equal to 1, when laser beam 6, 7 scans entire surface of resistor layer 1, fig. 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2812

Claims 16, 20, 23, 49, 76 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Basseches et al. 3,148,129 in view of Poisel 4,485,370 and Mochizuki 4,533,935, previously applied.

The reference(s) teach the features :

Basseches et al. discloses a method for increasing an electrical resistance of a resistor:

forming an anodization electrical circuit which includes: a DC power supply 7, 8, 9, 10, an electrolytic solution 5 comprising oxygen (water, nitric, acetic. Citric, oxalic acid, nitric acid HNO_3 containing NO_3 gas particles), the resistor 3 partially immersed in the electrolytic solution 5, and a cathode 6 partially immersed in the electrolytic solution 5, wherein the resistor 3 (with an resistance layer, col. 2, lines 10-11) is electrically coupled to a positive terminal of the DC power supply such that the resistor 3 serves as an anode, and wherein the cathode is electrically coupled to a negative terminal of the DC power supply, fig. 2 and col. 2, lines 10-71, lines 45-60, col. 2, lines 38-45,

activating (initiated by closing the switch 8) the DC power supply such that the DC power supply generates a voltage output, wherein the voltage output causes an electrolytic reaction in the electrolytic solution near the resistor 3, wherein the electrolytic reaction generates oxygen ions from the oxygen in the electrolytic solution, and wherein the oxygen particles include the oxygen ions; and oxidizing the fraction of the surface layer with the oxygen ions to increase the resistance of resistor 3, col. 2, lines 37-54,

testing (monitoring with monitor means 10) the resistor 3 during the oxidizing step to determine the desired resistance has been attained, col. 2, lines 39-55,

The difference between the reference(s) and the claims are as follows:

Basseches et al. teaches increasing an electrical resistance of a resistor on a substrate by using anodization process but does not teaches the resistor can be formed in a semiconductor structure and fraction of resistor is less than 1 micron. However, Poisel teaches at col. 3, lines 40-67, forming a resistor in an integrated circuit (a semiconductor structure) by using anodization and nitridation process to increase the resistance of a resistor. And, and the specific dimension of resistor as claimed are taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious. In re Aller, 105 USPQ 233 (CCPA 1955). And, even if applicants' modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art, In Re Sola 25 USPQ 433.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified Basseches et al. process by forming a resistor in the semiconductor structure (integrated circuit) as suggested by Pisel because resistor can be as a part of integrated circuit such RC circuits. And, It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified Basseches et al. process by having a fraction or resistor layer less than one micron as suggested by Mochizuki because the resistor can be made in smaller size.

Claims 24, 49-50, 66 stand rejected under 35 U.S.C 103 as being unpatentable over Basseches et al. as applied to claims 16, 20, 23, 74-75, above, and further in view of Mochizuki et al. 4,533,935 and Skill level of an ordinary person in the art, previously applied.

The difference between the references applied above and the instant claim(s) is: Basseches et al. teaches increasing the resistance in a portion of a resistor but does not teach specific dimension of the resistor. However, Mochizuki teaches at col. 5, lines 1-13, forming a resistor portion of less than 1 micron and the specific dimension of resistor as claimed are taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious. In re Aller, 105 USPQ 233 (CCPA 1955). And, even if applicants' modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art, In Re Sola 25 USPQ 433.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings with a resistor less than 1 micron because the dimension of a resistor determine the resistance of a resistor and such resistance value is taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious.

Claim 59 stand rejected under 35 U.S.C 103 as being unpatentable over Gofuku et al. as applied to claims 1, 5, 10-12, 47, 55, 56, 57, 60-66, 67, 69, 71-73 above, and further in view of Mochizuki et al. 4,533,935 and Skill level of an ordinary person in the art, previously applied.

The difference between the references applied above and the instant claim(s) is: Gofuku teaches increasing the resistance in a portion of a resistor but does not teach specific dimension of the resistor. However, Mochizuki teaches at col. 5, lines 1-13,

forming a resistor portion of less than 1 micron and the specific dimension of resistor as claimed are taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious. In re Aller, 105 USPQ 233 (CCPA 1955). And, even if applicants' modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art, In Re Sola 25 USPQ 433.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings with a resistor less than 1 micron because the dimension of a resistor determine the resistance of a resistor and such resistance value is taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious.

Claims 51-54, 68, 70 stand rejected under 35 U.S.C 103 as being unpatentable over Gofuku et al. as applied to claims 1, 5, 10-12, 47, 55, 56, 57, 60-66, 67, 69, 71-73, above, and further in view of Wang et al. 5,547,881 and Blanchard 4,707,909, previously applied.

The difference between the references applied above and the instant claim(s) is: Gofuku et al. teaches increasing the resistance in a portion of a resistor with laser beam radiation and oxygen gas but does not teach using electron beam or ion beam and using nitrogen gas. However, Wang teaches at col.4, lines 1-17, using ion beam radiation and nitrogen to change the resistivity of a resistor. And, Blanchard teaches at col. 3, lines 23-36, using electron beam radiation to change the resistivity of an resistor

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to modify the above references' teachings with ion beam or electron beam and/or nitrogen to change the resistivity because ion beam or electron beam would react with the resistor so that the resistivity is altered.

Conclusions

Applicant's arguments filed June 28, 2006 have been fully considered but they are not persuasive. Because Mochizuki clearly teaches treating the resistor layer in dry oxygen gas, hence the gas is inherently either flowing or non-flowing. Therefore, it meets the Markush group language of select from the group consisting of, that is either select flowing or non-flowing oxygen gas. And, Mochizuki also teaches using dry oxygen at about 1000 degree C, hence, it inherently performs the oxygen treatment in the oven chamber. Since, oxygen treatment in the oven chamber, hence, it is inherent that dry oxygen is not flowing. Basseches clearly teach at col. 1, lines 45-60, col. 2, lines 38-45, anodization process is an oxidation process as well known in the art and electrolytic solution oxidizing solution, such as oxalic acid, nitric acid, etc. that contains oxygen ions in the solution, see any basic chemical text book, e.g. $\text{HNO}_3 \rightarrow \text{H} + \text{NO} + \text{O}_2$.

Gofuku clearly teaches at col. 6, lines 34-68 and fig. 1-2, blowing oxygen on the spot (fraction of resistor layer 1) which is flowing or a sealed vessel with a window filled with gas which is non-flowing oxidizing on the spot of layer beam 6, 7, resulting in the increasing of the electrical resistance of the resistor 1. The spot size (fraction of F) is less than resistor layer 1.

Mochizuki clearly teach at col. 5, lines 1-13a dimension of the portion of the resistor does not exceed about 1 micron.

Poisel also teaches col. 4, lines 43-68, that resistor value can be change by anodization process which is an oxidation process.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry of a general nature or clerical matters or relating to the status of this application or proceeding should be directed to the customer service whose telephone number is (703) 308-4357.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (571) 272-1684. The examiner can normally be reached on from 7:00 Am to 4:00 Pm., Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873.

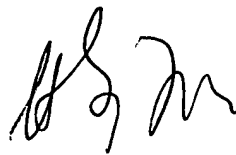
The fax phone number for this Group is 571-273-8300.

Application/Control Number: 10/753,241
Art Unit: 2812

Page 10

hjt

8/26/2006

A handwritten signature in black ink, appearing to read 'H. Jey Tsai', is positioned above the printed name.

H. Jey Tsai
Primary Examiner
Patent Examining Group 2800